Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

series there were no cases of thrombosis either during hospital stay or during the 6 months of follow-up. This route has also been associated to an increase in infections. However, in our series no infections were documented during either hospital stay or the 6-month follow-up period. This fact could be attributable to the correct observation of strict hygiene and to the fact that the duration of TPAF was short (4.9 ± 4.6 days).

The use of TPAF has been related to an increase in cost, because the active fixation electrocatheter is more expensive.[4] However, this is compensated by a lower incidence of complications compared with passive fixation electrocatheters,[5] mainly in the form of electrode dislocation—which in the case of traditional TTP sometimes makes it necessary to use different electrodes—and the risk of perforation associated to repeated manipulation. Likewise, since the pulse generators are reusable, the overall cost of the procedure is not incremented. The presentation of this technique therefore highlights the safety for the patient of carrying an electrode more stable than the traditional electrodes, avoiding the risk of dislocations. Since the number of TTP procedures in our Unit is low due to the short time interval to definitive pacemaker implantation, TPAF placement via the femoral route is fundamentally used in situations in wait of resolution of the cause of bradycardia (intoxications, myocardial necrosis or myocarditis) or in wait of a full echocardiographic study (performed in the Unit) to determine the type of definitive device (traditional generator, resynchronization therapy and/or defibrillator), or because the patient has reported to the Unit on non-working days.

In conclusion, and considering the limited size of our study sample, the results obtained suggest that TPAF via the femoral route is a safe temporary pacing strategy. Nevertheless, further studies of a multicenter nature are needed, involving larger patient samples, in which the results are also compared against those of passive fixation electrodes—thereby reinforcing the importance of the Department of Intensive Care Medicine in relation to cardiac pacing in this country.

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2173-5727/

COVID-19 Severity Index: A predictive score for hospitalized patients☆

COVID-19 Severity index: sistema de prediccion para pacientes hospitalizados

Dear Editor,

The way in which outbreaks affect countries depends on multiple factors and its impact is difficult to foresee.[1] However, the numbers of infected people and casualties are evidence that despite attempts to plan, the global healthcare systems remain unprepared.[2] The intensity of staffing and the sophisticated training required for the care of patients with viral infections during pandemics, result in the fact that a relatively small number of patients can easily overwhelm healthcare systems.[3]

The identification of variables related to worse outcomes is key for triaging and adapting the intensity of care that each patient requires, allowing effective strategic planning and better administration of human and material resources. Moreover, the need for a sensitive and predictive model is mandatory to avoid a delayed recognition of severely ill patients or those at risk of presenting further complications.[4]

During the early phase of COVID-19 pandemic Liao et al. propose an early warning score based on an adapted ver-

☆ Please cite this article as: Huespe I, Carboni Bisso I, Di Stefano S, Terrasa S, Gemelli NA, Las Heras M. COVID-19 Severity Index: A predictive score for hospitalized patients. Med Intensiva. 2022;46:98–101.

sion of the National Early Warning Score 2 (NEWS-2) adding *age* as a variable, based on actual evidence of being an independent risk factor for survival.[5]

Considering the high number of patients admitted with COVID-19, a specific early warning system (EWS) including laboratory test results, clinical features and radiological findings, could improve the detection of high-risk patients for optimization and a better management of hospital resources, mainly relevant in low-income countries.[6,7]

COVID-19 Severity Index was developed as a triage tool based on the NEWS-2 score,[8] that could rapidly and reliably be used by frontline healthcare personnel to identify high-risk patients. For the construction of this index, a narrative review was conducted to generate a list of possible predictors based on clinical signs and symptoms, comorbidities, laboratory and radiographic findings. After initial identification of 44 predictive variables of worse outcome, they were subjected to a 2-round Delphi process with participants from different countries around the world, diverse backgrounds and multiple areas of expertise.

At the stage of analysis, each answer was given a number between 0 and 3 (high (3), moderate (2), minimal (1), not applicable (0)) based on the strength of the answer.[9] The number for each domain was tabulated to calculate a weighted effect (WE) to help determine the selection threshold. The WE was calculated following the formula below:

$$\textbf{Weighted Effect} = \text{Predictive Potential} \times 2 + \text{Reliability} - \text{Resources or Training}$$

$$\text{e.g. : } \textbf{Weighted Effect}_{\text{Asthma}} = \text{Moderate}(2) \times 2 + \text{Moderate}(2) - \text{Minimal}(1) = 5$$

WE was calculated for each variable and each expert's opinion. The sum of the WE's for a given variable was ranked for further selection of those with the greatest value.

Afterwards, a threshold was chosen based on a desired number of predictors. Then, variables with WE above the threshold were included in a final set of predictor variables. Those variables below the threshold were carefully reviewed by the research team and discharged or included in Round 2 for re-evaluation depending on the value obtained. Any additional variables proposed by participants were also evaluated in Round 2.

A final set of selected variables was combined with a modified NEWS-2 score to generate the COVID-19 Severity Index (Fig. 1). Patients were divided into four risk categories based on their score (Fig. 2).

This score was studied to test its potential predictive capacity for ICU transfer 24 and 48 h elapse of time. A group of 220 patients with confirmed infection were evaluated; 19 of which were unexpectedly transferred to the ICU; 17 were transferred during the first three days, one at day 5 and another one at day 6 from admission.

A comparison between *COVID-19 Severity Index*, NEWS score adapted by Liao et al.[5] and NEWS-2 score was made. All three EWS were measured on the first, second and third day after hospital admission. For those who were initially admitted into general wards and were later transferred to the ICU, the score was retrospectively applied for the 24, 48 and 72 h prior to the ICU admission, with the intention to identify whether if there were parameters that could predict the need of a more intensive monitoring or not.

PARAMETERS	3	2	1	0	1	2	3
Age (years)				≤60	61 - 64	≥65	
Male gender			yes	no			
Heart failure			yes	no			
COPD			yes	no			
Diabetes with end - organ damage			yes	no			
Chest X - Ray*				Normal or without bilateral infiltrates	Bilateral infiltrates		
Respiratory rate (breaths per minute)	≤8		9 - 11	12 - 20		21 - 24	≥25
SpO_2 (%)	≤91	92 - 93	94 - 95	≥96			
SpO_2 (%) in COPD	≤83	84 - 85	86 - 87	≥88			
Suplemental O_2	yes			no			
Systolic BP (mmHg)	≤90			90 - 219			≥220
Pulse (Beats per minute)	≤40		41 - 50	51 - 90	91 - 110	111 - 130	≥131
Temperature (°C)	≤35		35,1 - 35,5	35,6 - 37,9	38 - 39	≥39,1	
Dyspnoea		yes		no			
D-Dimer** (ng/ml)				≤1000	>1000		
Lymphocytes* (per mm^3)				≥1000	<1000	≤500	
Platelets* (per mm^3)				≥10000	<10000		

Figure 1 COVID-19 Severity Index.
* Chest X-Ray should be analyzed on admission but it will be reconsidered when a new one is performed.
** If laboratory test results have more than 48 hours, they will not be considered.
COPD: chronic obstructive pulmonary disease.

SCORE	CLINICAL RISK	ALERT LEVEL	NURSING SURVEILLANCE	RESPONSE	SOLUTION
0-2	Low	Green	Every 12 hours	Standard nursing surveillance	General ward
3-5	Moderate	Yellow	Every 6 hours	Frecuent nursing surveillance	General ward
6-7	High	Orange	Every 2 to 3 hours	Intensive nursing surveillance and physician notification	Evaluate intensive care admission
8 or more	Critical	Red	Continuous monitoring	Immediate physician notification	Intensive care unit

Figure 2 COVID-19 Severity Index risk chart.

A comparative analysis of the area under the curve (AUC) for the different scores evidenced a better capacity of the *COVID-19 Severity Index* to predict the need for ICU admission. When applied 24 h prior to transferal, the AU-ROC for our score was 0.94 vs. 0.88 for the modified NEWS score developed by Liao et al., and 0.80 for NEWS-2 (Fig. 2). When applied 48 h prior to ICU admission, the AU-ROC for COVID-19 Severity Index was 0.88, 0.84 for the modified NEWS and 0.62 for NEWS-2.

The digital medical record was electronically set for an automatic calculation and constant update of the COVID-19 Severity Index as soon as the latest laboratory results and vital signs were recorded. This provided real-time information for deciding the most suitable area of care for each patient.[10]

Specifically designed for the current COVID-19 pandemic, *COVID-19 Severity Index* serves as a reliable tool for strategic planning, organization and administration of resources by easily distinguishing hospitalized patients with higher risk and need of a prompt ICU transfer.

Declarations

Ethics approval

This project has been approved by the Ethics Committee for Research Protocols at Hospital Italiano de Buenos Aires (Cod. 1290).

Consent of publication

Not applicable.

Data availability statement

All relevant data are within the manuscript and its supporting.

Funding

Authors received no specific funding for this work.

Conflict of interests

Authors have declared that no competing interests exist.

Acknowledgments

We would like to thank the experts Marcos Marino, Sergio Giannasi, Fernando Vazquez, Martin Hunter, Leonardo Uranga, Chung Kyu, José Dianti, Manuel Tisminetzky, Bruno Ferreyro, Federico Angriman, Eduardo De Vito, Silvia Quadrelli, Alejandro Chirino, Eduardo Tobar and Pablo Gastaldi for their enthusiastic contribution and suggestions in the modified Delphi process. We would like to thank Lisandro Ziperovich (Zipper Art) for the artwork of this study and Maria de los Angeles Magaz for draft editing. Finally we would like to thank Valeria Burgos, Pablo delgado, Marina Bezzati, Mailen Oubina, Jorge Sinner, Marcelo Risk and Eduardo San Roman for their support and guidance.

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Detection of frailty and palliative needs from discharged critical care patients in collaboration with primary care☆

Detección al alta de UCI de la fragilidad y necesidades paliativas del paciente crítico en colaboración con atención primaria

Sir,

Our population is growing older, and this implies an increase in age-related chronic diseases. As a result, we have a growing number of elderly persons with multiple health problems and with a poor functional reserve.[1] All this indicates that the number of frail individuals in the Intensive Care Unit (ICU) will continue to rise.[1] Such patients present greater disability at the time of discharge, are more likely to be admitted to a sociosanitary center, and experience greater mortality and longer convalescence periods.[2,3]

In view of the above, early detection of frailty is needed, and we should be aware of the prognostic usefulness of frailty as a complement to the usual mortality-centered scales employed (APACHE, SAPS3, etc.). In this way we could redirect our efforts to ensure earlier empathic and honest conversations focused on the shared planning of care, respecting the desires, preferences and values of our patients and their relatives.[3] In addition, the detection of frailty at discharge from the ICU could be of help in continuous clinical decision making and in improving the efficiency of the healthcare system.

The Health Plan[4] of Catalonia (Spain) 2011–2015 sought to place priority on prevention and care in people with advanced chronic disease conditions. The primary care teams (PCTs), using the NECPAL (*NECesidades PALiativas* [Palliative Needs]) tool,[5] identified two frail person profiles: complex chronic patients (CCPs) and patients requiring an advanced chronicity care model (ACCM), with the idea of adopting an individualized care plan (Individualized Shared Intervention Plan [ISIP]) including advanced decision planning (ADP). All this in turn is recorded in the shared case history of Catalonia (SCHC) with the purpose of facilitating decision making.

The NECPAL tool was designed by the Qualy-ICO-CCOMS observatory, and has been validated in our setting for the identification of people with advanced chronic disease, an estimated life expectancy of 12 months, and a need for palliative care of some kind – the activation of specific plans therefore being necessary[5] (Appendix B, see Supplementary material).

Given the new populational paradigm, the important and persistent barriers facing decision making regarding the adequacy of life support care (ALSC) and end-of-life care,[6] which obliges intensivists to decide in this regard, and in concordance with the Health Plan[4] of Catalonia, we decided to be more proactive in detecting these patients, conducting prognostic follow-up and seeking to ensure early detection of their predictable palliative needs.

In this context, over a period of 6 consecutive months and in all patients discharged from our ICU, we determined whether they were identified as CCPs or ACCM, and whether they had ISIP and/or ADP. If the patients were identified but did not have ISIP and/or ADP, interconsultation of the liaison nurse with the PCTs was made, recording the time to implementation of the ISIP and/or ADP. In turn, based on the NECPAL, we identified those patients in need of palliative care, reporting them to the LN to facilitate their identification as CCPs or ACCM and implementation of the ISIP and/or ADP. Lastly, during one year of follow-up, we checked how many patients were finally catalogued and whether they had their ISIP and/or ADP.

The study was approved by the Ethics Committee of our center. Since no interventions different from those of routine practice were involved, informed consent from the patients or their representatives was not considered necessary.

Of the 471 discharged patients, 24.6% (n = 116) were NECPAL positive, with a predominance of males (66.4%, n = 73) and a mean age of 66.3 ± 13 years. The mortality rate at one year was 28.9% (n = 33). Of all the subjects, 16 (13,7%) were previously CCPs (n = 14) or ACCM (n = 2), and 9 (56.2%) had their ISIP, while only one of them moreover also had ADP. After the year of follow-up and the pertinent LN interconsultations, a total of 10 ISIP (62.5%) and 4 ADP had been established (25%). Of the other 100 NECPAL positive patients at discharge, information corresponding to the SCHC could not be obtained in 5 cases, thus leaving 95 patients. At one year, 25.2% of them (n = 24) were catalogued as CCPs (n = 20) or ACCM (n = 4) by the PCTs, though 75% (n = 18) had been catalogued as such at 6 months. In this same period of

☆ Please cite this article as: Ferré C, Canelles S, Daniel X, Rubio O, Esteban F, Pobo A. Detección al alta de UCI de la fragilidad y necesidades paliativas del paciente crítico en colaboración con atención primaria. Med Intensiva. 2022;46:101–103.